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Factors influencing access to inclusive finance among farmers in Ondo state, Nigeria

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ABSTRACT

Food insecurity is a challenge that arises from insufficient access to food productivity which manifests in various forms in different households based on the available entitlements. For rural agricultural groups that most rely on subsistence agriculture, food security is chiefly realized through food productivity. Similarly, food productivity is enhanced based on the level of finance available for farmers. This study examined the factors influencing inclusive finance among farmers in Ondo state, Nigeria. This study adopts a mixed (qualitative and quantitative) research method. Data was obtained from six hundred fifty-seven (657) respondents through questionnaires that were administered to farmers in Okitipupa and Ayeka of Okitipupa Local Government Areas in Ondo State. Logistic Regression Analysis (LRA) was used to examine the critical factors influencing inclusive finance in agriculture. The study found that Transactions made by the use of E-Banking, Type of Crop Planted, Ownership of Farmland, Years of Farming Experience, and Ownership of Investment accounts are the critical factors influencing inclusive finance in agriculture in the study areas. Based on the findings, it is suggested that the factors identified should be critically examined when deciding on farmers that will have access to inclusive finance in Ondo State; therefore, access to inclusive finance should not be based on favoritism or political influence, the farmers should be encouraged to open an investment account to invest the credit, as this reality will enhance the sustainability of food production.

Keywords: Inclusive finance; Agriculture; Food productivity; Food security

1. INTRODUCTION

A significant development in the Nigerian economy cannot be realized without agriculture. Sustainable agriculture has the advantages of satisfying the urgent need of humans for food, shelter, and clothing and protecting natural resources (Edeogbon et al., 2008). Agriculture is the backbone of the West African economy and, even in Nigeria where more than 70 percent of the population derives their source of living from agriculture and more than 90 percent of the government's earnings are from

crude oil (Adeniran and Oladun, 2020). Food productivity is highly connected to food security as it signifies food availability and food supply which in turn, controls the degree of food consumption and consumer health (Akinyele, 2010). In this study, food productivity and food security will be used alongside as their meanings are not farfetched from each other.

Between the years 1970 and 1998, there was a noticeable fall in food productivity, because of the oil boom when many able-bodied Nigerians abandoned their farmland to hare in the newly found wealth (Adeniran and Ben, 2018). The enormous rise in oil proceeds in Nigeria formed exceptional, unpredicted, and unintended riches for the country, and then began the remarkable alteration of policies starting a holistic move toward highlighting them against the state of the oil field. Furthermore, by making the business atmosphere and background more favorable for fresh and innovative investments, the government devoted fresh wealth to the socio-economic infrastructures, especially in the urban areas Oladipo and Fabayo, (2012), while most rural areas were abandoned. Agriculture which is the sole means of banishing hunger was neglected.

It is a primary economic activity in the African trade and industry sector that can occupy about 55 percent of the population. There is steady progress in food productivity in Africa because of the continuous increase of agricultural expenditures and private-sector investment in seeds and fertilizers. This development is evident in food productivity and improved nutrition. Nonetheless, several factors are undermining food productivity in Africa, among which are insecurity, climate change, global warming, floods, lack of agricultural financing, and others. Regarding agricultural funding, the International Finance Corporation (IFC) has encouraged agricultural credit since it has been a notable instrument against poverty. Noted that agrarian credit is in the form of farm inputs (fertilizers, seeds) or money input to farmers which the farmers will pay back with interest.

Inclusive finance is the process of ensuring availability, opportunity ability, and adoption of the formal financial system by individual affiliates of the economy without any difficulty. Ahmed, (2006) noted that financial inclusion has to do with the liberation and delivery of banking services most especially the credit, savings, payment, insurance, and pension without any difficulty and at an affordable cost to all sectors of the economy, particularly the low-income sectors (agricultural sector) that are situated in the agrarian bucolic regions. The fundamental standard of inclusive finance is well understood to be significant in recent times because of its perceived function being the driver of agricultural growth and development. Financial inclusion is recognized to harmonize agrarian growth as the two constructs contribute significantly to poverty alleviation and banishing hunger.

It is essential for the process of agricultural growth and development since as many agricultural stakeholders (particularly farmers) are conscious of the formal financial system, they are brought into it and this helps in plummeting the amount of money that is outside the banking system and thus catalyzes agricultural investment. Martin and Clapp, (2015) acknowledged that the opportunity to finance is an essential policy tool that is usually adopted by the government to combat and stimulate the developmental process given its tendency to facilitate effective and efficient allocation of resources, hence minimizing the cost of capital. Leyshon and Thrift, (1995) pointed to the fact that the concept of financial inclusion portrays the condition in which all citizens have the opportunity to their desired and appropriate financial services to effectively manage their money.

According to Paramasivan and Ganeshkumar, (2013), it is pertinent to note that a nation's economy cannot significantly develop holistically when a significant number of people are marginalized and barred from having the opportunity to the financial system because they are recognized to be major pillars of the economy. Despite the efforts targeted at fortifying the intensity of financial inclusion in developing nations like Nigeria, Beck et al., (2007) revealed that the opportunity for financial services may not have guaranteed increased adoption of financial services. The maturity of financial mediators has resulted in robust economic growth on a macro level, but the outcomes at the individual level are not so clear. Beck further revealed that reducing the financial impediments usually increases the adoption of financial services being dished out such as loans.

Demirguc-Kunt et al., (2017) revealed that despite the earlier revelation of Beck, the level of opportunity ability and implementation of loans from formal financial institutions has low significance in the economies of developing nations. According to Serrao et al., (2013), about 2.5 billion young people in the world are not opportune to formal financial services; as a result of this financial inclusion remains a complicated issue in many countries. Based on relevant data, there is an implication that financial services may not be made ready for everyone who requires them because of certain reasons such as financial illiteracy, lack of awareness, unsuitable environmental framework, policy defects and inconsistencies, peculiarities of the countries, corruption, etc. As this applies to the world's young population, farmers are not excluded from the inefficacies of those factors.

In Nigeria, the banking sector has grown enormously in the last two decades and has become the glee for them to establish many branches to the extent of transnational and multi-national levels, thereby attracting Foreign Direct Investments (FDIs). Nonetheless, the

Central Bank of Nigeria (CBN) noted that only a limited number of farmers participated in formal banking, particularly in the Northern part where agriculture is recognized to be highly practiced. It was also identified that the level of financial inclusion in agricultural practices is very low. There is a challenging fair price negotiation and a high level of discrimination against farmers who are meant to benefit from the financial services. The need to have functional financial inclusion in agriculture has resulted in inequitable growth.

Having a clue about financial inclusion is essential for society because the probable products of financial inclusion are the encouragement of current accounts, the encouragement of savings accounts, the adoption of mobile banking, the introduction of rural banking, adoption of electronic banking, among others. In many rural areas where agriculture is recognized as the major occupation of the dwellers, internet banking may not be realistic because of the neglect in terms of infrastructural development and social amenities such that the mobile telecommunication network is being challenged and many farmers may not be able to subscribe to internet banking. Also, the epileptic situation of the power supply in the region may hinder them from up-to-date information.

Food insecurity is a challenge that arises from insufficient access to food productivity that manifests in various forms in different households based on the available entitlements. For rural agricultural communities that most rely on subsistence agriculture, food security is chiefly realized through food productivity. This study examines how the availability of financial inclusion through microfinance can impact food productivity, to get better food security in Nigeria. For a long time, financial inclusion through microfinance was known to be a solution for alleviating poverty and improving welfare (Morduch, 2000). This scenario changed as a result of many negative impacts of borrowing such as over-indebtedness, high interest rates, stress during repayment, lack of control over loan issuance, increasing rate of violence, and socio-cultural issues which all manifested (Ganle et al., 2015).

Poverty is a critical issue in most developing nations of the world, as well as Nigeria in particular. It is a vicious phase resulting in hunger and malnutrition and is catalyzed by swift the increasing growth of the population. Also, Okuneye, (2001) stated that poverty is a disturbing issue that is affecting the majority of households headed by farmers' folks. More than three-quarters of the world's population that reside in rural areas are poor, and they engage in agricultural-related activities. In recent times, Nigeria has experienced a shortage of food supply and a high cost of food prices. Low-income citizens have limited access to adequate and quality food.

Additionally, the agricultural products (crops and animal produce) that emanate from the rural areas are mostly consumed in cities across the world. For agricultural products to match up with the level of increasing population with an annual growth rate of 1.7 percent, farmers need to shift from the conventional method of farming to a modern method of farming with improved technology. This modern method of farming is enhanced with financial inclusion. Against this background, this study is set to examine the factors influencing inclusive finance among farmers in Nigeria.

Literature Review

Inclusive finance, according to the Organization for Economic Cooperation and Development (OECD) and the International Network on Financial Education (INFE), OECD, (2012), is the promotion of timely, affordable, and appropriate access to a broad range of regulated financial services and products, and the extension of their use by all societal segments through the execution of innovative and personalized actions which entails financial education aimed at enhancing social and economic inclusion and well-being of the citizens. Inclusive finance is the process of ensuring availability, opportunity ability, and adoption of the formal financial system by individual affiliates of the economy without any difficulty. Ahmed, (2006) noted that financial inclusion has to do with the liberation and delivery of banking services most especially the credit, savings, payment, insurance, and pension without any difficulty and at an affordable cost to all sectors of the economy, particularly the low-income sectors.

In this study, it will be captured with microcredit finances. Agricultural finance is the provision of different types of financial products in the form of credit lines, subsidized loans, guarantees, fiscal credit, priority-lending regulation, overdraft facilities, and matching grants. Agricultural credit is the provision of credit facilities which is essential for the development of the farming sector (Mattia et al., 2016). Also noted that agricultural credit is a form of financial credit that should be made available to farmers for procuring farm machinery and equipment. noted that agricultural credit can be in the form of farm inputs (fertilizers, seeds) or money input to farmers which the farmers will pay back with interest. Four major approaches emanate from this definition. These include:

- Accessibility issues which deal with the availability of financial services in particular geographical areas. Therefore, the lack of access is key to the absence of financial intermediaries in those geographical areas (Claessens and Perotti, 2007).

- The second issue is the consumption of financial services, which is the conclusion of both supply and demand (Claessens, 2006). The failure to adopt financial services by individuals may not necessarily be a reflection of the lack of access to financial services, because some people may be exposed to financial access at minimal and affordable prices, but prefer not to employ them for a wide range of reasons.
- The third issue deals with the capabilities that are essential to meet the supply of financial services and the demand for financial services. There is widespread appreciation of the magnitude of authorizing users the power to take positives of the potential advantages of financial inclusion. It is also important to note that the capabilities of financial sector supervisors and regulators are needed to enhance an enabling environment for financial inclusion (Arnold and Rhyne, 2016).
- To finish, the fourth issue deals with the aim and purpose of financial inclusion. From literature and empirical review, there is a broad theoretical and empirical literature that examines inclusive financial as an instrument with the budding to develop individuals' capacity to increase their well-being (Barajas et al., 2015). This makes it possible to securely gather assets, and leverage the available assets to invest in both physical things, the financial inclusion of small rural producers contributes to the IFAD principles (IFAD, 2016)

Empirical evidence of financial inclusion

Several researchers have investigated the link between inclusive finance and agricultural development. In this study, examining the variables for determining farmer's demand for savings and credit which is beyond their level of accessibility is quite important as it is used to assess the effect of financial inclusion on farmer's vulnerability. It is pertinent to note that literature on this subject matter is quite rare, but the available ones that were reviewed identified the effects of clients' indices or characteristics on financial inclusion. In a study conducted by Turvey et al., (2011) in China, it was revealed that the informal nature of lending between families, relatives, and friends can reinstate the formal nature of credit even when the latter is obtainable. They also revealed that collaterals can be a hindrance to financial inclusion.

Demographic characteristics, such as education level, age, gender, household size, and gender of household head are factors proven to influence access to inclusive finance. Concerning the factors militating against inclusive finance accessibility, the study of Turvey and Xiong, (2017) in China revealed that the lack of education particularly financial education can militate against the adoption of financial services. Financial education upholds online banking and electronic accessibility to credit. In the United States, Han et al., (2009) conducted a study on a wider scale of factors militating against inclusive finance and found that lack of supply of services such as loans in the rural areas, competition within the sector, and high level of transaction costs are factors militating against accessibility to inclusive finance in the US.

Zhu et al., (2010) revealed that environmental issues such as heterogeneity between banks that are situated in rural areas and urban areas are the major militating against accessibility to inclusive finance in China. According to Ozili, (2018), financial inclusion is the access to, and provision of financial services to all members of the population most especially the poor, aged, and other members of the population that are easily excluded from benefitting from the government. Furthermore, Dev, (2006) pointed out that financial inclusion is the delivery of banking services at a reasonable price to low-income groups. Sahay et al., (2015) observed that it is the adoption of, and access to, formal financial services. The dominant indicator in these definitions is that there were emphases that each member of the population should be espoused to and have access to available financial services.

A major policy objective that the governments of various emerging and developing countries have been concentrating on is financial inclusion, and there is great potential that financial inclusion will enhance the excluded population's access to formal financial services and products. Governments of many countries are keen to ensure that their citizens benefit without focusing on a particular set of citizens. They are making giant strides to accomplish a lofty height regarding financial inclusion for all citizens including the elites and the marginalized. Among the successes of financial inclusion are in Rwanda which was pointed out in the studies of Lichtenstein, (2018), Otioma et al., (2019), in India which was pointed out in the study of in Peru which was pointed out in the study of Kenya which was pointed out in the studies of (Ndung'u, 2018; Hove and Dubus, 2019).

In Africa, Demirguc-Kunt et al., (2013) discovered that the major sources of borrowing are from formal institutions, followed by friends and families. It is interesting to note that the major purpose of borrowing in Africa is not to make wealth but for events or ceremonies such as weddings, funerals, school fees, and other emergency purposes. As a result of this ideology, over 500 million adults in Africa are not included in the formal financial sector. Most of the common factors militating against accessibility to inclusive finance

in African countries are distances from financial institutions, paperwork processing for the finance, and the cost of servicing loans. Skees and Barnett, (2006) noted that this is also prevalent in India, Peru, and the Philippines because of the high cost of operation in the countries.

In Rwanda, a form of financial inclusion is embedded in community savings and credit cooperatives. Within the space of three years, these cooperatives, which are referred to as Umurenge SACCOs, have involved more than 1.6 million customers, and about 90 percent of Rwandans now reside within a 5-kilometre radius of an Umurenge SACCO. In India, the PMJDY program was organized to improve the level of financial inclusion for most citizens and it became a huge accomplishment in the early years of the program. In the subsequent years of the PMJDY program, there was evidence of some challenges on the supply side such as stumpy subsidies, and stumpy supply incentives to the providers of financial services. In Kenya, the M-Pesa is a major instrument to enhance financial inclusion for the people of Kenya.

In fact, the M-Pesa was introduced in 2007, which transformed Kenya's financial system. Based on the M-Pesa, in 2006, the level of financial inclusion rose from 26.4 percent to 40.5 percent in 2009 and the level of financial exclusion declined from 39.3 percent to 33 percent (Ndung'u, 2018). In Peru, there is an existence of an interoperable mobile money platform, which is referred to as "Modelo Peru". This was embarked upon to bring mobile financial services. Another service that was embarked upon in Peru is the "Bim" service which allows any Peruvian with a mobile phone to access funds by opening a bank account and making deposits without visiting a bank. Hence, there is evidence of achievements regarding the financial inclusion policies and programs being adopted in some countries. Nonetheless, two major issues usually emanate:

Financial inclusion may increase the risk to vulnerable and poor customers in society, and increase the benefit of high-income customers profiteering from financial institutions;

The need whether financial inclusion should be opportuned to only those who have never taken part in the formal financial sector or to those who have been relatively distant to adopting financial products.

The policy literature entails more idealistic elucidations on how to accomplish financial inclusion while the academic literature that was conducted by Sarma and Pais, (2011), Demirguç-Kunt and Klapper, (2013), Cull et al., (2014), Morgan and Pontines, (2014), Mehrotra and Yetman, (2015) focused more on the nexus between financial inclusion and income inequality and poverty levels as well as the cause and effect of financial inclusion on the overall economy. Theories are significant because they are suitable for combining literature. They best explain ideas surrounding the objectives and the nitty-gritty of financial inclusion, current observations in the practice, and the abnormalities in the practice of financial inclusion. Some observed practices of financial inclusion are:

Adopting ultimatum strategies to coerce citizens to obtain a bank verification number;

Adopting mobile technology to access finance;

Opening of bank accounts with less documentation processes and requirements;

Granting free debit cards;

Granting free insurance policies;

Enrolling for a mortgage without making compulsory equity payment;

Adopting a direct government-to-person (G2P) payment system; and

Large-scale adoption of bank correspondents, among others.

Empirically, the issues surrounding inclusive finance in agriculture around the world and Africa in particular have been explored. However, there were no empirical affirmed in Nigeria and Ondo state in particular. On this premise, this study will examine inclusive finance in Ondo state, Nigeria.

2. METHODOLOGY

This study adopts mixed (qualitative and quantitative) research methods through personal observation and questionnaire interviews to collect primary data. The study is designed in such a way as to examine the impact of inclusive finance on food productivity in Nigeria. Furthermore, the study employed a multistage sampling technique. The population adopted in this study will comprise the categories of small-scale farmers in rural agriculture in Okitipupa, Ondo state. The study was carried out in Okitipupa Local Government, Ondo State Nigeria. Okitipupa is a local government area in Ondo State, Nigeria. Its headquarters are in the town of Okitipupa, it has always been known as Ode-Idepe.

The name okitipupa originated from the elevation of the town and the color of the soil of the town which is red referred to the Yoruba language and its dialects as 'pupa'. Okiti-pupa is derived from the Yoruba language okiti(hilly) and pupa(red) which was used by people traveling from other communities to trade in the Okitipupa central market. Today, inhabitants interchangeably use the names of okitipupa and idepe freely. It is native to the Ikales, who are a subset of the larger Yoruba tribe. The respondents for this study will be farmers involved in agriculture. They are mainly farmers participating in food productivity. A multistage sampling technique will be used in selecting the respondents.

The first stage will involve a purposive sampling of the local government area in Ondo State. The second stage will be a purposive sampling of two (2) communities from the local government area. The communities selected are Okitipupa and Ayeka of the Okitipupa Local government area in Ondo State. The third stage includes the selection of 657 farmers. According to Zikmund, (2003), the various error allowances were determined and the suitable one was chosen based on the discretion of the researcher. The chosen error allowance of 0.04 was employed to establish the sample size as shown in the equation below:



Figure 1 Map of Ondo State showing local government areas

Source: Moses, (2016); Edited by Author

The formulae for achieving sample size $n = \frac{Z^2}{4E^2}$

where;

n = sample size;

Z = Z score for the confidence interval (2.05);

E = Error allowance (0.04)

When inserted into the formula, the Sample Size was approximately 657. It is therefore crucial that the questionnaire distribution target six hundred and fifty-seven respondents. The analysis was achieved with SPSS version 21. Regarding the recommendations of the sample size for factor analysis, Adeniran et al., (2020) provide the following guidance concerning the determination of sample size adequacy: such that the sample size of hundred is poor; a sample size of two hundred is fair; a sample size of three hundred is good; a sample size of five hundred is very good, and sample size of one thousand or more is excellent. In this study, the sample size of six hundred and fifty-seven (657) is adequate for regression analysis and reporting as rooted in the study of (Adeniran and Tayo-Ladega, 2024; Adeniran et al., 2024).

Method of Data Analysis

In this study, the data analysis was established and carried out in two different stages, which are the descriptive-analytical stage and the inferential-analytical stage. The first stage is the descriptive-analytical stage. This form of analytical technique will throw insight into the dynamics of responses of how the respondents give expression to the variables under study. The research instrument that will be used in this study to generate primary data is the questionnaire. It consists of carefully structured statements or questions prepared to obtain some factual and adequate information. The study adopts the Logistic regression analysis for analysis.

Model estimate for regression

Model estimate for ordinary least squares, multiple regression model. The multiple regression model specified for the impact of inclusive finance on food productivity is as follows:

Model 1: Inclusive Finance on Food Productivity Model

$$Y = f(OA, OIA, ATM, TeB, AC, Age, Equi, Hsize, Edu, Ctype, LandO, FarmS) \dots\dots(1)$$

This model will be transformed into an econometric model as

$$Fp = \beta_0 + \beta_1 OA + \beta_2 OIA + \beta_3 ATM + \beta_4 TeB + \beta_5 AC + \beta_6 Age + \beta_7 Equi + \beta_8 Hsize + \beta_9 Edu + \beta_{10} Ctype + \beta_{11} LandO + \beta_{12} FarmS + \epsilon_1 \dots\dots(2)$$

where;

Fp is the dependent variable that represents food productivity and it is measured as crop yields kg per hectare.

OA is the ownership of a savings account; OIA is the ownership of an investment account; TeB is the transaction made by the use of e-banking; AC is the accessibility to credit by a farmer; Age is the estimated age of the farmers; $Equi$ is the usage of farm equipment; $Hsize$ is the household size; Edu is the education level of farmers; $Ctype$ is the type of crop that a farmer plant; L and O is the ownership of the land of the farmer; and $FarmSize$ represent the size of the land used by a farmer in farming;

ϵ_1 is the stochastic disturbance (error) term in the model;

β_0 is the constant term or intercept; and

β_1 -12 are the parameters of regression coefficients.

To enable the interpretation of the elasticities, which captures the degree of responsiveness of the dependent variable (Food Productivity) to the respective independent variable (Inclusive Finance), it is essential to introduce a log into the model. The model will be transformed into:

$$\ln Fp = \beta_0 + \beta_1 OA + \beta_2 OIA + \beta_3 ATM + \beta_4 TeB + \beta_5 AC + \beta_6 Age + \beta_7 Equi + \beta_8 Hsize + \beta_9 Edu + \beta_{10} Ctype + \beta_{11} LandO + \beta_{12} FarmS + \epsilon_1 \dots\dots(3)$$

3. RESEARCH FINDINGS AND DISCUSSIONS

This section presents the analysis and results of the study. It begins with the response rate of a presentation. Descriptive statistical analysis was conducted on each of the variables adopted in the study, whilst inferential statistical analysis such as logistic regression analysis was employed to validate the formulated hypotheses.

Response Rate of Respondents

The sample size was calculated to about six hundred and fifty-seven (657) which equals the total number of copies of questionnaires administered by the researcher targeted at the farmers in Okitipupa and Ayeka of Okitipupa Local government area in Ondo State, four hundred and thirty-nine (439) which is about 66.82% copies of questionnaire were valid and returned for data analysis and reporting. The remaining (218) copies of the questionnaire were not used in the data analysis because of different invalidity issues. In the two selected communities (Okitipupa and Ayeka), the questionnaire was divided into three hundred and twenty-nine (329) and three hundred and twenty-eight (328) respectively.

In Okitipupa, two hundred and forty-one (241) which is about 73.3% copies of the questionnaire were valid and returned for data analysis and reporting. The remaining (88) copies of the questionnaire were not used in the data analysis because of different invalidity issues. In Ayeka also, hundred and ninety-eight (198) which is about 60.4 percent copies of the questionnaire were valid and returned for data analysis and reporting. The remaining (130) copies of the questionnaire were not used in the data analysis because of different invalidity issues. Hence, all the valid questionnaires returned were processed for data analysis, and the response rate was shown in (Table 1).

Table 1 A response rate of respondents

Location	Questionnaire	Frequency	Percentage
Okitipupa	Administered	329	-
	Returned	241	73.3
	Not Returned	88	26.7
Ayeka	Administered	328	-
	Returned	198	60.4
	Not Returned	130	39.6

Field Survey (2020)

It was noted by Fadare and Adeniran, (2018), and Mugenda and Mugenda, (2003) that a response rate of fifty (50) percent of copies of the questionnaire returned is adequate for data analysis and reporting; a response rate of sixty (60) percent copies of questionnaire returned is good for data analysis and reporting and a response rate of seventy (70) percent or more copies of questionnaire returned is excellent for data analysis and reporting. Hence, the response rates of 73.3% and 60.4% for Okitipupa and Ayeka respectively are adequate for data analysis and reporting.

Descriptive Analysis

In this part, descriptive analysis was presented regarding all the variables that justify the study questions established. Analysis of the questionnaire was carried out to derive a realistic decision for sound conclusions and recommendations. From the total four hundred and thirty-nine (439) copies of valid questionnaires retrieved from the six hundred and fifty-seven (657) questionnaires distributed at Okitipupa and Ayeka communities in Okitipupa Local Government Area, there was a survey of socioeconomic factors of the respondents (farmers) and other key variables which included gender, age, education, ownership of savings account, ownership of investment account, transaction made by e-banking, accessibility to credit, usage of farm equipment, household size, type of crop planted, ownership of farmland, farm size, years of farming experience, and the level of farm productivity in terms of output.

The following information provided a summary of the samples obtained from the survey in the form of descriptive statistics. From Table 2, it was shown that the number of female farmers was higher than that of males. Out of 439 respondents, 50.8% respondents were female while 49.2% were male, this implies that females are more responsive to agriculture in Okitipupa Local Government Area

Most of them were of working age, between 21- and 50-years bracket, representing 93.2% of respondents. This implies that the majority of the farmers were still in their economic active age which could result in a positive effect on food production. This corroborates the findings of who observed that the age of farmers has a significant influence on Maize production in Kaduna state and Yam production in Edo state, respectively.

Furthermore, the majority of the sampled respondents had one form of former education or the other and also vocational training. 54% of the sampled respondents were older with a tertiary education certificate, and 36.9% were holders of vocational certificates. This implies that the younger generations have realized that agriculture is the means to solving the nations' dwindling economic situation. This corroborates the findings of which observed that formal education has a positive influence on the adoption of improved seed varieties, technology, and innovation among farmers. The majority of the sampled respondents (farmers) (57.9%) are owners of savings accounts, 50.8% are owners of investment accounts, and 68.6% make monetary transactions through electronic mediums.

This implies that the sampled farmers are aware of various financial solutions that enhance the ease of monetary payment. 57.2% of sampled respondents perceived that they do not have access to credit. In addition, 77.9% of sampled respondents often adopt farm equipment (farm machinery) during cultivation which saves time, cost, and energy. Farm equipment is adopted during pre-planting, planting, and post-planting operations. The adoption of farm equipment may be among the government's strategies to improve farming activities and encourage youths to embrace agriculture. For household size involved in farming, it was revealed from the sample respondents that the majority of the households that are involved in farming are four in size representing 52.2%, followed by five household sizes representing 26.4%.

This implies that most of the farmers enjoy the agricultural task when they are not alone in the household. Some are usually encouraged by the words coming from another member of the household. Household size implies that larger households tend to participate more than smaller ones and this may be because larger households can have a cheaper source of the labor force in the form of family labor for use in the agricultural value chain. This argument is supported by. Regarding the type of crop planted, the majority of the crops planted in Okitipupa are food crops representing 55.1%. Food crops are grains, legumes, spices, and tubers, and are usually annual or biannual crops. This implies that Okitipupa is a major source of staple food for feeding the south-west part of Nigeria and the produce can be exported which will attract foreign exchange.

For the ownership of farmland, 58.3% of respondents perceived that farmers in Okitipupa acquire their farmlands through leasing for a particular period. It is pertinent to note that since land is a good asset for farming, the government should play a significant role in allocating land to farmers. Concerning the farm size (Hectares), the survey of sample respondents revealed that about 75.4% cultivate between 3.5 hectares to more than 4 hectares. This implies that the level of farm produce will be higher. Most farmers (75.1%) have between 1 and 10 years of farming experience. This means that they must have acquired good experience in farming. Found that the length of time in farming activities can be linked to the age of farmers and access to finance.

Concerning productivity, the majority of sample respondents achieved between 1000kg and 1500kg (49.2%) of farm produce. This is linked to the level of farm size that is cultivated. Concerning the adequacy of training programs, 52.2% of sampled respondents perceived that the proceeds from credit facilities are not adequate for food security. Even though 51% of sampled respondents perceived that training programs about credit accessibility are frequent, 46.2% perceived that it is not frequent. Hence, there is a need to intensify awareness programs and provide training on credit facilities for farmers.

Table 2 Descriptive analysis of the variables

Variables	Sub-variables	Frequency	Percentage
Gender	Male	216	49.2
	Female	223	50.8
Age	Below 21	14	3.2
	21-30	109	24.8
	31-40	68	15.5
	41-50	232	52.8
	51-60	16	3.6
Education	No Formal	16	3.6

	Primary	18	4.1
	Secondary	15	11.4
	Tertiary	237	54.0
	Vocational	118	36.9
Ownership of Savings Account	No	185	42.1
	Yes	254	57.9
Ownership of Investment Account	No	216	49.2
	Yes	223	50.8
Transaction made by E-Banking	No	138	31.4
	Yes	301	68.6
Access to Credit	No	251	57.2
	Yes	188	42.8
Usage of Farm Equipment	Not Used	15	3.4
	Not Often	25	5.7
	Not Sure	57	13.0
	Often	227	51.7
	Very Often	115	26.2
Household Size	1	15	3.4
	2	24	5.5
	3	55	12.5
	4	29	52.2
	5	116	26.4
Type of Crop Planted	Food Crops	242	55.1
	Cash Crops	197	44.9
Ownership of Farmland	Owner Operator	183	41.7
	Non-Farming Land Owns	256	58.3
Farm Size (Hectares)	0.5-1.0	26	5.9
	1.5-2.0	29	6.6
	2.5-3.0	23	12.1
	3.5-4.0	215	29.0
	Above 4.0	116	26.4
Year of Farming Experience	1-5	250	56.9
	6-10	80	18.2
	11-15	64	14.6
	Above 15	45	10.3
Productivity	Below 1000kg	116	26.4
	1000-1500kg	216	49.2
	Above 1500kg	107	24.4
Adequacy of proceeds	No	229	52.2
	Yes	210	47.8
Training	Not frequent	203	46.2

programs	Frequent	224	51.0
	Most frequent	12	2.8

Source: Source: SPSS Output, Version 21 (2021)

Factors Influencing Inclusive Finance in Agriculture

The first hypothesis was coined and analyzed in (Table 3a). The analysis is used to buttress the result on the critical factors influencing inclusive finance in agriculture. Inclusive finance is represented by access to finance and depends on influencing factors such as Age, Formal Education, Ownership of Savings Account; Ownership of Investment Account; Transaction made by the use of E-Banking, Usage of Farm Equipment, Household Size, Type of Crop Planted, Ownership of Farmland; Farm Size, and Experience of Farmer.

H01: The crucial factors influencing inclusive finance in agriculture are not significant

Using logistic regression analysis on Statistical Package for Social Sciences (SPSS) version 21, the level of significance that is p value of 0.003 is less than the chosen significance level of 0.05 as shown in (Table 3a); hence, on an aggregate level, this is a basis to reject the null hypothesis and affirm the numerical evidence that the crucial factors influencing inclusive finance in agriculture are significant in the study area.

From (Table 3b), the factors influencing inclusive finance in agriculture are Ownership of an Investment Account with a regression coefficient of 0.029, Transaction made by the use of E-Banking with a regression coefficient of 0.802, Type of Crop Planted with a regression coefficient of 0.197, Ownership of Farmland with a regression coefficient of 0.147, and Years of Farming Experience with a regression coefficient of 0.059. From hierarchy, the critical factors influencing inclusive finance in agriculture based on the rank of regression coefficients are Transactions made by the use of E-Banking, Type of Crop Planted, Ownership of Farmland, Years of Farming Experience, and Ownership of Investment Account.

It is therefore important to note that a farmer's accessibility to credit (which represents inclusive finance) is influenced by the ability of the farmer to use electronic banking. For farmers to be able to use e-banking for monetary transactions, this implies that such farmers must be formally educated. The studies of found that farmers' formal education positively influences their level of acquisition and utilization of information on improved technology by the farmers as well as their innovative adoption of innovations. An example of such innovation is the usage of electronic banking. Such farmers will be highly informed and aware of various approaches to receiving government agricultural loans and grants (Adeniran et al., 2019).

Furthermore, farmer's accessibility to credit is influenced by the type of crop planted by the farmers. From the descriptive statistics, it was revealed that the majority of the crops planted in Okitipupa are food crops representing 55.1%. This study corroborates the findings of Philip et al., (2009) that the government often provides short and medium-term credits to farmers who are engaged in food production. This approach will stimulate food security Obansa and Maduekwe, (2013), and will reduce the poor performance of the agricultural sector in Nigeria's economy with its resultant food shortages and high food prices (Bango, 2001).

Ownership of farmland is another major factor influencing accessibility to credit. The land is a basic resource on which agricultural production takes place. It is commonly argued that a productive land holding needs at least one hectare (Birhanu, 2002; Musahara, 2006). In this study, it was revealed that the majority of the farmlands are not owned directly by farmers. This implies that the farmlands are bigger to be owned by farmers. The bigger a farm size is, the more it influences the increase in farm produce and the more such farmers will have access to government aid in the form of finance, or mechanization.

Table 3a Model Variables in the Equation

		B	S.E.	Wald	Sig.	Exp(B)
Step 0	Constant	-.289	.096	8.978	.003	.749

Source: SPSS Output, Version 21 (2021)

Table 3b Variables in the Equation

		B	S.E.	Wald	Sig.	Exp(B)
Step 1(a)	Age	-.087	.110	.632	.426	.917
	FM	-.004	.175	.001	.981	.996

	OSA	-.097	.204	.228	.633	.907
	OIA	.029	.200	.021	.883	1.030
	TEB	.802	.226	12.596	.000	2.230
	UFE	-.074	.103	.513	.474	.929
	HS	-.109	.172	.399	.528	.897
	TCP	.197	.201	.955	.328	1.218
	OF	.147	.203	.523	.469	1.158
	FS	-.067	.092	.535	.464	.935
	Experience	.059	.096	.381	.537	1.061
	Constant	-.103	.994	.011	.918	.903

a Variable(s) entered on step 1: Age, FM, OSA, OIA, TEB, UFE, HS, TCP, OFL, FS, Experience.

Wald chi2(11) = 18.380 N = 439

4. CONCLUSION AND RECOMMENDATIONS

Agriculture is the backbone of the West African economy and, even in Nigeria where more than 70% of the population derive their source of living from agriculture and more than 90% of the government's earnings are from crude oil. Food productivity is highly connected to food security as it signifies food availability and food supply which in turn, controls the degree of food consumption and consumer health from each other. Food insecurity is a challenge that arises from insufficient access to food productivity which manifests in various forms in different households based on available entitlements. For rural agricultural communities that most rely on subsistence agriculture, food security is chiefly realized through food productivity. Also, food productivity is enhanced based on the level of finance available for farmers.

This study examined the factors influencing inclusive finance among farmers in Ondo state, Nigeria. This study employed the research philosophy of pragmatism during the inquiry to link knowledge and action. This study adopts mixed (qualitative and quantitative) research methods through personal observation and questionnaire interviews to collect primary data which will be used to achieve descriptive statistics. The study employed a multistage sampling technique to address the research questions. The research design is a survey research design, and the sample size was calculated to about six hundred and fifty-seven (657) which equals the total copies of questionnaires administered by the researcher targeted at the farmers in Okitipupa and Ayeka of Okitipupa Local government area in Ondo State, four hundred and thirty-nine (439), three hundred and twenty-nine (329) and three hundred and twenty-eight (328) respectively.

Using logistic regression analysis on Statistical Package for Social Sciences (SPSS) version 21, the critical factors influencing inclusive finance in agriculture based on the rank of regression coefficients are Transactions made by using E-Banking, Type of Crop Planted, Ownership of Farmland, Years of Farming Experience, and Ownership of Investment Account. The study found that the critical factors influencing inclusive finance in agriculture based on the rank of regression coefficients are Transactions made by using E-Banking, Type of Crop Planted, Ownership of Farmland, Years of Farming Experience, and Ownership of Investment Account.

Based on the specific findings, it is therefore recommended that the Transaction made by the use of E-Banking, Type of Crop Planted, and Ownership of Farmland should be critically looked into when deciding on farmers that will have access to inclusive finance in Ondo State, Nigeria. Access to inclusive finance should not be based on favoritism or politicization. Whenever a farmer wants to borrow, such a farmer should be encouraged to open an investment account to invest the credit. This will go a long way to key the farmers into the reality of sustainable growth.

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Author Contributions

Adesina Oyelami: Introduction, Methodology, Data collection, Analysis.

Iyanuoluwa Olamide Aliu: Data collection, Analysis, Interpretation.

Oluwafemi Royal Aliu: Literature review, Data collection, Editing, Proofreading.

Adeola Oluwatosin Adeniran: Conceptualization, Introduction, Proofreading, Visualization.

All authors read and approved the manuscript.

Ethical approval

The study was approved by the Ethics Committee of the Department of Agricultural Science, Osun State College of Education, Ila-Orangun (Ethical approval code: AAO/2023/0001).

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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